Video signal switcher

BA7604N

The BA7604N is switching ICs developed for use in VCRs. It has two-channel analog multiplexers, and features wide dynamic range, and wide operating frequency range, and is suitable for switching audio and video signals.

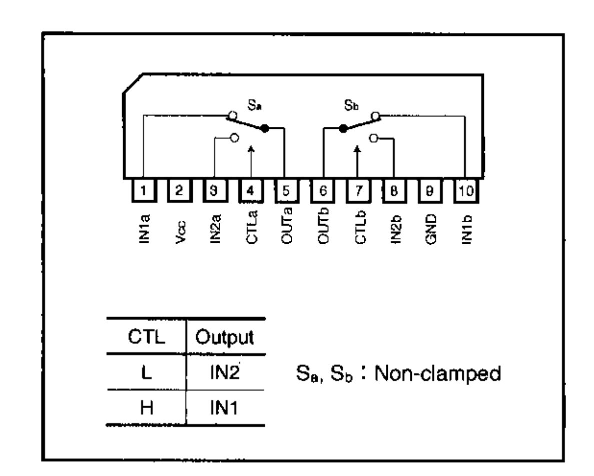
●Applications

VCRs and TVs

●Features

1)Two 2-input / 1-output switches.
2)5V power supply.
3)Low power consumption (42mW Typ.).
4)Excellent frequency characteristics (10MHz, 0dB Typ.).
5)Wide dynamic range (3.0V_{P-P} Typ.).
6)High input impedance (20kΩ Typ.).
7)Fast switching speed (50ns Typ.).

●Block diagram



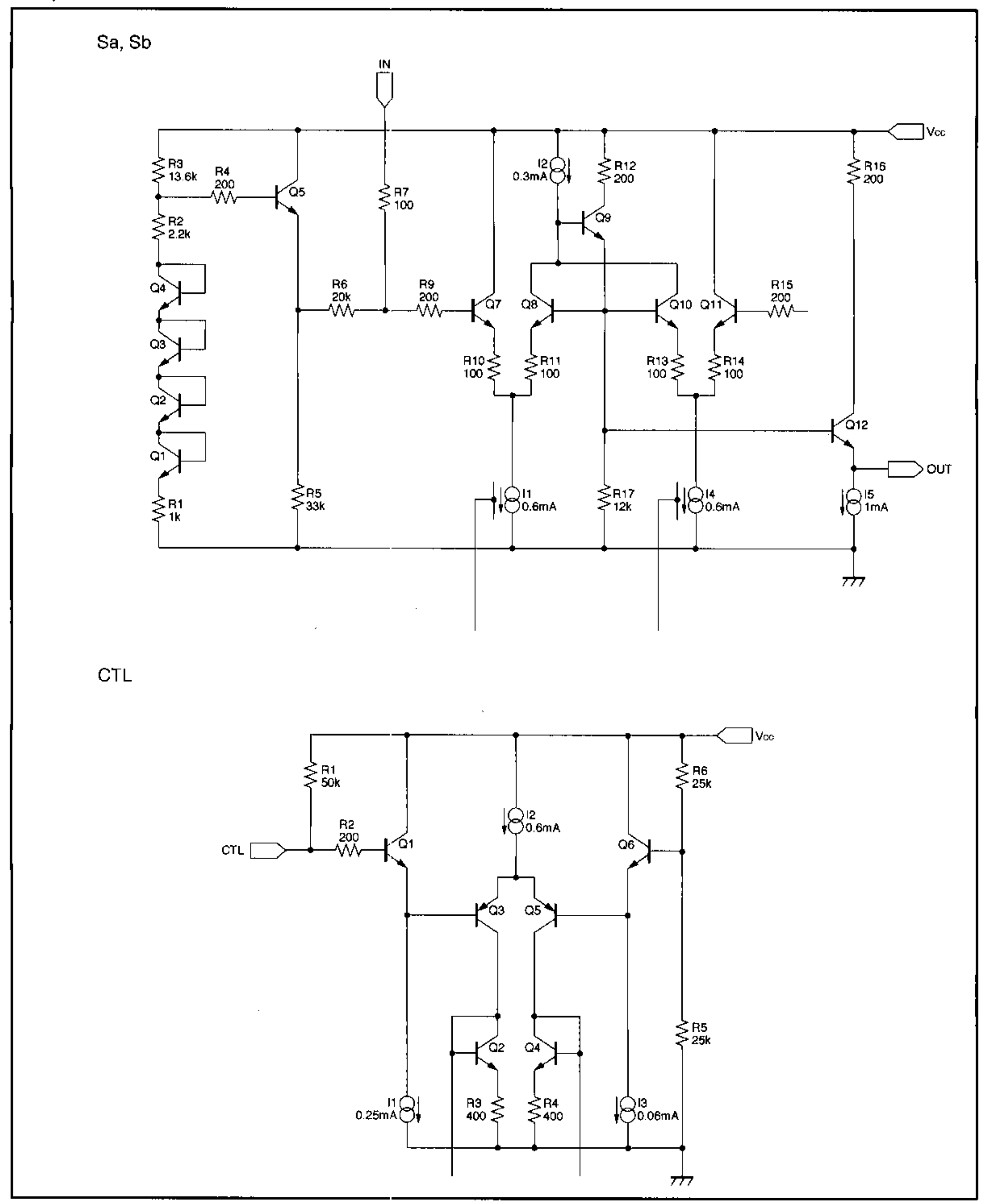
●Absolute maximum ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit
Power supply voltage	Vcc	9	V
Power dissipation	Pd	500*	mW
Operating temperature	Topr	−40~85	℃
Storage temperature	Tstg	−55~125	℃

* Reduced by 5.0mW for each increase in Ta of 1°C over 25°C.



●Equivalent circuits



●Electrical characteristics (Unless otherwise specified Ta=25℃ and V_{CC}=5.0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Operating voltage	V_{CC}	4.5	5.0	5.5	V	—
Circuit current	I_{CC}	—	8.4	13.0	mA	—
Maximum output level	V_{om}	2.7	3.0	—	V_{P-P}	f=1kHz, THD=0.5%
Voltage gain	G_V	−0.5	0	0.5	dB	f=1MHz, V_{IN}=1V_{P-P}
Interchannel crosstalk	C_T	—	−65	—	dB	f=4.43MHz, V_{IN}=1V_{P-P}
Frequency characteristic	G_f	−3	0	1	dB	10MHz / 1MHz, V_{IN}=1V_{P-P}
Total-harmonic distortion	THD	—	0.007	—	%	f=1MHz, V_{IN}=1V_{P-P}
CTL pin switch level	V_{TH}	2.0	2.5	3.0	V	—
Input impedance	Z_{IN}	14	20	26	kΩ	—

Note: Refer to the measurement circuit given in Fig. 1.

●Reference data

Pin DC voltages (reference values) Units: Vdc

Pin No.	DC voltage	Pin No.	DC voltage
1	2.48	6	1.76
2	5.00	7	4.91
3	2.48	8	2.48
4	4.91	9	0
5	1.76	10	2.48

Electrical characteristics

Parameter	Min.	Typ.	Max.	Unit
Input impedance (no clamp)	—	20k	—	Ω
Output impedance	—	30	—	Ω

The input coupling capacitor values should be 0.1 μF to 1 μF.

●Measurement circuit

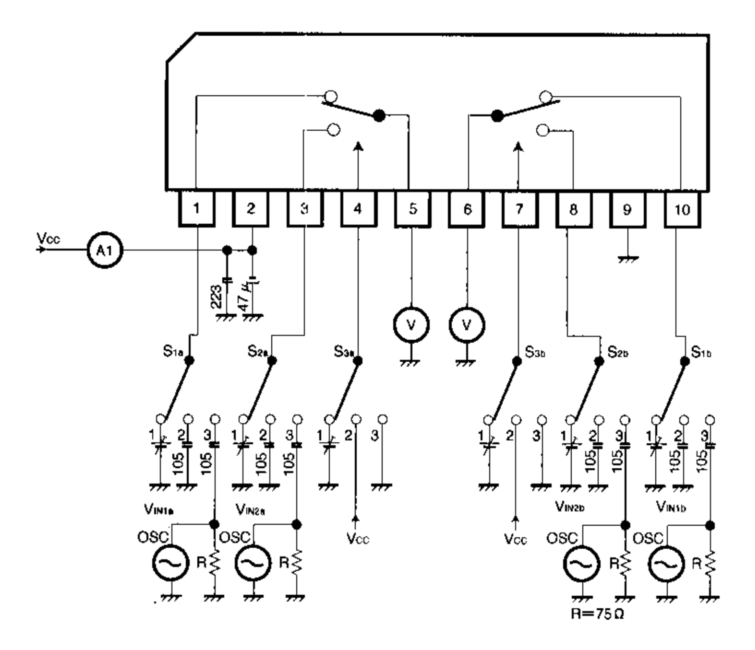


Fig.1

●Measurement conditions

Parameter		Symbol	Switch settings S_{1a}	S_{2a}	S_{3a}	S_{1b}	S_{2b}	S_{3b}	Measurement method
Current consumption		I_{CC}	2	2	2	2	2	2	Ammeter
Maximum output level	In1a	V_{om}	3	2	2	2	2	2	Note 1
	In2a	V_{om}	2	3	3	2	2	2	
	In1b	V_{om}	2	2	2	3	2	2	
	In2b	V_{om}	2	2	2	2	3	3	
Voltage gain	In1a	G_V	3	2	2	2	2	2	Note 2
	In2a	G_V	2	3	3	2	2	2	
	In1b	G_V	2	2	2	3	2	2	
	In2b	G_V	2	2	2	2	3	3	
Interchannel crosstalk	In1a	C_T	2	3	2	2	2	2	Note 3
	In2a	C_T	3	2	3	2	2	2	
	In1b	C_T	2	2	2	2	3	2	
	In2b	C_T	2	2	2	3	2	3	
Frequency characteristic	In1a	G_f	3	2	2	2	2	2	Note 4
	In2a	G_f	2	3	3	2	2	2	
	In1b	G_f	2	2	2	3	2	2	
	In2b	G_f	2	2	2	2	3	3	
CTL pin switching level	CTLa	V_{TH}	3	2	1	2	2	2	Note 5
	CTLb	V_{TH}	2	2	2	3	2	1	
Total-harmonic distortion	In1a	THD	3	2	2	2	2	2	Note 6
	In2a	THD	2	3	3	2	2	2	
	In1b	THD	2	2	2	3	2	2	
	In2b	THD	2	2	2	2	3	3	
Input impedance	In1a	Z_{IN}	1	2	2	2	2	2	Note 7
	In2a	Z_{IN}	2	1	3	2	2	2	
	In1b	Z_{IN}	2	2	2	1	2	2	
	In2b	Z_{IN}	2	2	2	2	1	3	

Note 1: Connect a distortion meter to the output, and input a f = 1kHz sine wave. Adjust the output level until the output distortion is 0.5%. This output voltage at this time is the maximum output level Vom ($V_{P\text{-}P}$).

Note 2: Input a $1V_{P\text{-}P}$, 1MHz sine wave. The voltage gain is given by $G_V = 20 \log (V_{OUT}/V_{IN})$.

Note 3: Input a $1V_{P\text{-}P}$, 4.43MHz sine wave. The interchannel crosstalk is given by $C_T = 20 \log (V_{OUT}/V_{IN})$.

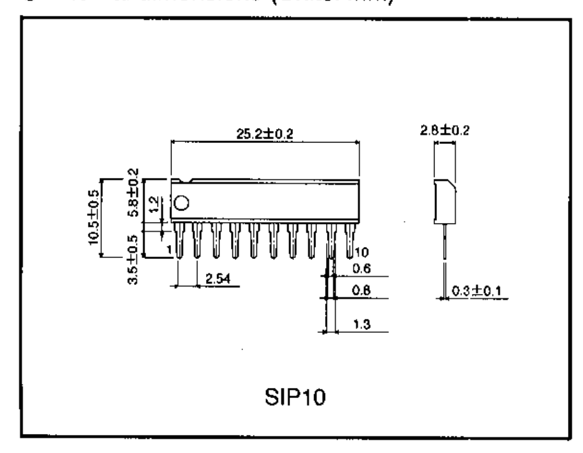
Note 4: Input $1V_{P\text{-}P}$, 1MHz and 10MHz sine waves. The frequency characteristic is given by $G_f = 20 \log (V_{OUT}(f = 10MHz)/V_{IN}(f = 1MHz))$.

Note 5: Input a $1V_{P\text{-}P}$, 1MHz sine wave. Reduce the CTL pin voltage from V_{CC}. The CTL pin switching level (V_{TH}) is the CTL pin voltage at which the V_{OUT} level drops below $20mV_{P\text{-}P}$.

Note 6: Input a $1V_{P\text{-}P}$, 1kHz sine wave and measure the total-harmonic distortion of the output using a total-harmonic distortion meter.

Note 7: Measure the input pin voltage V_{IN50} when a current of DC50 μA is flowing into the input pin. Measure the input pin open-circuit voltage. The input impedance is given by $Z = (V_{IN50} - V_{IN0})/50 \times 10^{-6}\ \Omega$.

●External dimensions (Units: mm)



SIP10